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MINISTRY OF FORESTS

Nass
Timber Supply Area

Rationale for
Allowable Annual Cut (AAC)
Determination

Effective August 1, 2002

Larry Pedersen
Chief Forester

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Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Nass Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the TSA

The Nass TSA comprises approximately 1 620 300 hectares in northwestern British Columbia. The TSA lies in the British Columbia Forest Service (BCFS) Prince Rupert Forest Region and is administered from the Kalum Forest District office in Terrace and a field office in Stewart. The Nass TSA is bounded by the North Coast and Cassiar TSAs to the west and north; the Kispiox, Cranberry, and Prince George TSAs to the east; and Tree Farm Licence (TFL) 1, the Nisga'a Lands, and Kalum TSA to the south. The two parks within the TSA are Meziadin Lake Provincial Park and Swan Lake-Brown Bear Park.

The terrain of the Nass TSA consists of coastal plains and rugged ice-capped mountains in the western portion, and is characterized by wide, flat plateaux, which are bordered by the Skeena and Coast Mountain ranges in the eastern portion. Within the area currently considered available for timber harvesting, leading-western hemlock stands cover about 70 percent and leading-subalpine fir (balsam) stands cover about 20 percent. Lodgepole pine, Sitka spruce and western redcedar also occur in this TSA, as do lesser amounts of deciduous tree species.

Of the entire TSA, 33 211 hectares are not managed directly by the BCFS, including Nisga'a Lands, parks, and private land. An additional 960 450 hectares or approximately 59 percent are considered non-productive or non-forested, including rock, swamp, alpine areas, and water bodies. The amount of Crown-owned productive forest land that is managed by the BCFS is 639 368 hectares or about 39 percent of the total TSA area.

- Lower Nass

The Lower Nass encompasses the Taylor, Taft and Bell-Irving watersheds, and the area west to the Nass TSA boundary, which is adjacent to the Cassiar TSA in the northwest and adjacent to the Kalum TSA, Nisga's Lands, TFL 1 and Cranberry TSA in the south. The major tree species in the Lower Nass are western hemlock (70 percent), balsam (20 percent), with smaller amounts of lodgepole pine, spruce, and deciduous tree species. Of these stands, about 46 percent are older than 250 years and 71 percent are older than 140 years.

- Upper Nass

The Upper Nass lies within the northeastern portion of the Nass TSA and includes the Sallysout watershed and the area east of the Taylor, Taft and Bell-Irving watersheds to the Nass TSA boundary, which is adjacent to the Prince George TSA. The dominant tree species are Englemann spruce, balsam and hemlock. The Upper Nass is undeveloped and

provides diverse wildlife habitat; it offers an opportunity for future recreation and forest management activities.

History of the AAC

In 1995, the original Kalum TSA was divided into two separate timber supply areas, which are now known as the Nass TSA (previously Kalum-North) and Kalum TSA (previously Kalum-South). The AAC for the Nass TSA during 1985 to 1996 was 1 250 000 cubic metres.

In 1996, the chief forester set the AAC at 1 150 000 cubic metres, representing a reduction of 8 percent from the previous AAC. In May 2000, the chief forester further reduced the AAC by 7600 cubic metres, in response to the ownership transfer of lands and forest resources to the Nisga'a Nation resulting from the Nisga'a Final Agreement.

The current AAC of 1 142 400 cubic metres has not yet been reapportioned to reflect the reduction of 7600 cubic metre per year; therefore the current apportionment by the Minister of Forests is as follows:

Apportionment	Cubic metres/year	percentage
Forest licences – replaceable	892 031	77.6
Forest licences – non-replaceable	62 469	5.4
Small Business Forest Enterprise Program	184 000	16.0
Forest Service Reserve	11 500	1.0
Total	**1 150 000**	**100.0**

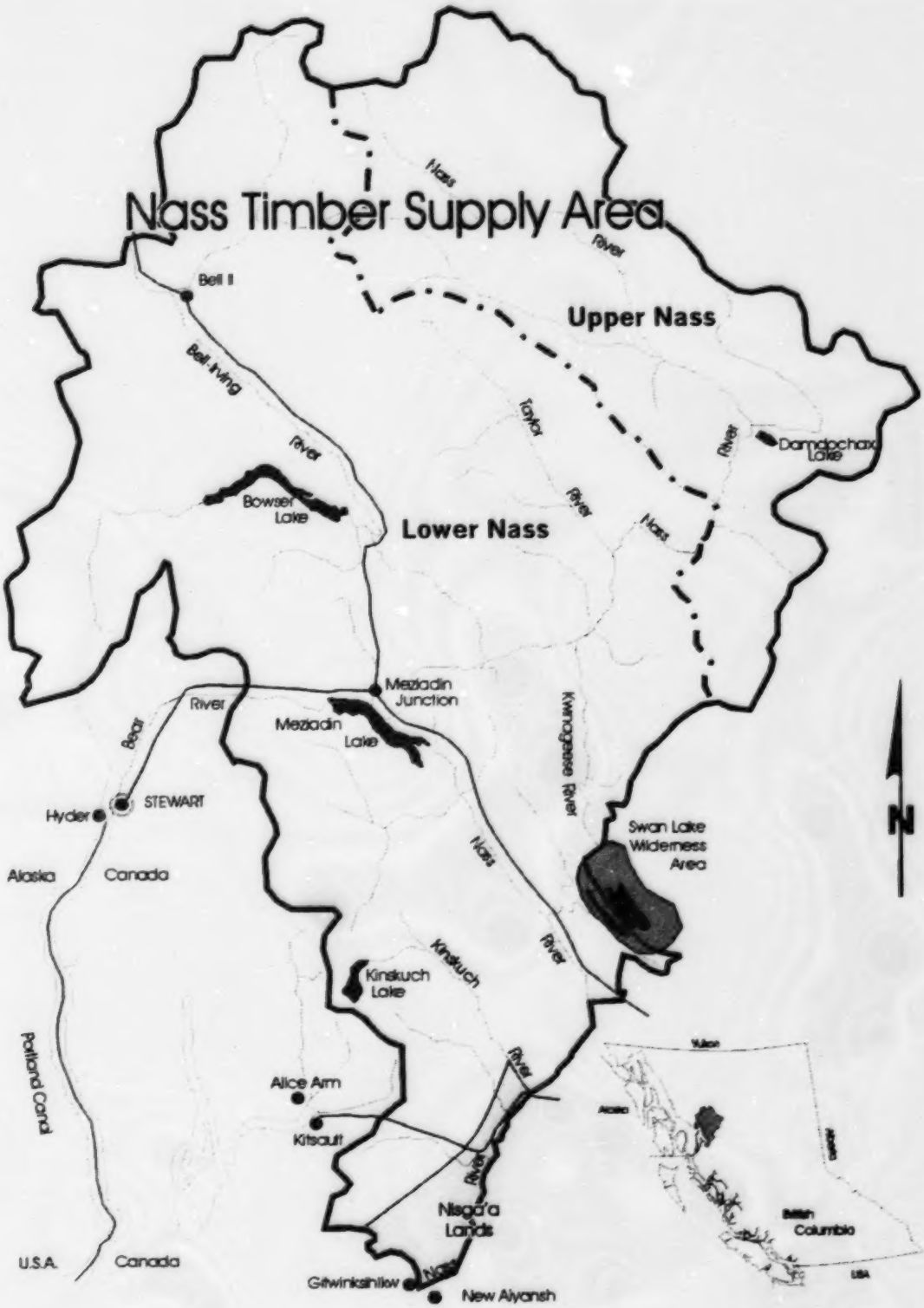
New AAC determination

Effective August 1, 2002 the new AAC for the Nass TSA will be 865 000 cubic metres, which represents a 24 percent reduction from the current AAC. This AAC includes a partition of 200 000 cubic metres for the Upper Nass (see Partition definition).

This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

- Partition definition

This partition is with respect to the Upper Nass, which encompasses the Sallysout watershed and the area east of the Taylor, Taft and Bell-Irving watersheds. The area is illustrated on the map below.


Nass Timber Supply Area
Upper Nass
Lower Nass
Bell II
Bell-Irving River
Bowser Lake
Nass River
Taylor River
Damdochax Lake
Meziadin Junction
Meziadin Lake
Bear River
Hyder
STEWART
Alaska
Canada
Kwinageese River
Swan Lake Wilderness Area
Kinskuch Lake
Kinskuch River
Portland Canal
Alice Arm
Kitsault
Nisga'a Lands
U.S.A.
Canada
Gitwinksihlkw
New Aiyansh
N
Yukon
Alaska
British Columbia
USA

Information sources used in the AAC determination

Information considered in determining the AAC for the Nass TSA includes the following:

- *Forest Practices Code of British Columbia Act*, consolidated to March 2001;
- *Forest Practices Code of British Columbia Act* Regulations and Amendments, current as of March 2001;
- Forest Practices Code of British Columbia Guidebooks, various dates;
- *Forest Practices Code Timber Supply Analysis*, 1996;
- *Identified Wildlife Management Strategy*, February 1999;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- *Nass TSA Data Package and Information Report*, BCFS, May 2000;
- *Nass TSA Analysis Report and Public Discussion Paper*, BCFS, June, 2001;
- *Nass TSA Summary of Public Input on Data Package and TSA Analysis Report*, BCFS, May 2002;
- *Nass TSA Rationale for AAC determination*, BCFS, January 1996;
- *Nass TSA Timber Supply Analysis*, BCFS, February 1993;
- *Nass TSA Inventory Audit*, BCFS Inventory Branch, October 1997;
- *Inventory Audit Report Upper Nass Zone of the Nass TSA-Revised November 1996*, BCFS Inventory Branch, April 1997;
- *Nass TSA Chart Area Analysis*, Sterling Wood Group Inc., January 1998; and
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS, including the AAC determination meeting held in Terrace, September 26 and 27, and a field tour of the Upper Nass held in the afternoon of September 26, 2001.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as the rate of timber growth and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. There is uncertainty about many of the factors used as inputs to timber supply analysis due in part to variations in physical, biological and social

conditions, although ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the social, cultural and economic factors that are relevant when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC determinations. The information does however provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the Nass TSA, I have considered known limitations of the technical information provided, and I am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for timber supply areas and tree farm licence areas. Section 8 is reproduced in full as Appendix 1.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires consistency when addressing these changes and associated uncertainties. To make my approach in these matters explicit, I have set out the following body of guiding principles. If, in some specific circumstance, it is necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to increase the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not

substantiated by demonstrated performance—or to factors that could work to reduce the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act* and its associated regulations (the Forest Practices Code).

The *Forest Practices Code of British Columbia Regulations* were originally approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time. The *Forest Practices Code of British Columbia Act* was brought into force on June 15, 1995.

Although the Forest Practices Code has been fully implemented since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination, I take this uncertainty into account to the extent possible in context of the best available information.

The eventual timber supply impacts associated with strategic land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy, and Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

Forest Renewal British Columbia (FRBC) has funded a number of intensive silviculture activities that have the potential to affect timber supply, particularly in the long-term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are improved from those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent decisions in the British Columbia Court of Appeal and the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting the Crown's obligations under these decisions. In this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the TSA or TFL. My determination is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

The British Columbia Court of Appeal decided in March 2002 that pending the final determination of the existence of aboriginal rights and title, the Crown has an obligation to consult with First Nations with respect to asserted rights and title in a manner proportional to the strength of the interests. I consider any information brought forward respecting First Nations' interests. In particular I consider information related to actions taken to protect interests, including operational plans that describe forest practices designed to seek to address such First Nations' interests. In this context, I re-iterate that my AAC determination does not prescribe a particular plan of harvesting activity, nor does it involve allocation of the wood supply to any particular party.

I am also aware of the provisions of the Nisga'a Final Agreement (the "NFA") among the Nisga'a Nation, Canada and British Columbia. The AAC that I determine should not in any way be construed as limiting the Province's obligations under the NFA.

If, subsequent to this determination, I become aware of information respecting First Nations interests that would substantially alter the estimate of timber supply underlying my determination, I may revisit my determination.

Overall, in making AAC determinations, I am mindful of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act* and of my responsibilities under the *Forest Practices Code of British Columbia Act* and the *Forest Act*.

The role of the timber supply analysis

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the timber supply review process.

For each AAC determination for a TSA, a timber supply analysis is carried out using an information package including data and information from three categories—land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (Forest Stand Simulator, or FSSIM), a series of timber supply forecasts is produced, reflecting different starting harvest levels, rates of change over time, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. This is known as the 'base case' forecast, and forms the basis for comparison when assessing the effects of uncertainty on timber supply.

Because it represents only one in a number of theoretical forecasts, and because it incorporates information about which there may be some uncertainty, the base case forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, much of what follows in the considerations outlined below is an examination of the degree to which all the assumptions made in generating the base case forecast are realistic and current, and the degree to which its predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are made on the basis of informed judgement, using current available information about forest management, which may well have changed since the original information package was assembled. Forest management data is particularly subject to change during periods of legislative or regulatory change, such as the enactment of the *Forest Practices Code*, or during the implementation of new policies, procedures, guidelines or plans.

Thus it is important to remember, in reviewing the considerations which lead to the AAC determination, that while the timber supply analysis with which I am provided is integral to those considerations, the AAC determination itself is not a calculation but a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed. Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the base case forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by attempting a computer analysis of the combined considerations to confirm the exact AAC determined.

The base case forecast for the Nass TSA

The base case forecast presented in the *June 2001 Nass Timber Supply Area Analysis Report* incorporated the most current available information on forest management, land base, and timber yields for the TSA. It included specific assumptions about the TSA, such as significant changes that influenced the land base, which occurred since the last timber supply analysis completed in 1993. These changes include:

- implementation of the *Forest Practices Code*, which took effect June 1995; and
- implementation of the Nisga'a Treaty, which took effect May 11, 2000.

The base case forecast for the Nass TSA projected an initial harvest level of 820 000 cubic metres per year for the first decade, followed by a series of 10 percent per decade declines prior to reaching the steady long-term harvest level of 407 000 cubic metres per year in the eighth decade. The initial harvest level in the base case is 28 percent lower than the current AAC.

In the previous (1993) timber supply analysis, the base case forecast showed that an initial harvest level of 1 250 000 cubic metres could be maintained for one decade followed by a series of 9.5 percent per decade declines for 11 decades prior to reaching the steady long-term harvest level of 385 000 cubic metres per year. The main difference between the current 2001 initial harvest level and the previous 1993 initial harvest level is due to the exclusion of 156 773 hectares of productive forest from the timber harvesting land base located in the Upper Nass area. The exclusion of this area is discussed in more detail below, in the 'Upper Nass' section.

In this rationale, I will discuss many of the timber supply analysis assumptions in the context of my considerations for this AAC determination. However, where my review of an assumption has concluded that I am satisfied it was appropriately modelled in the base case forecast as reported in the timber supply analysis, I will not discuss my considerations in detail in this document. However, some factors for which the assumptions were appropriately modelled in the analysis may nonetheless warrant discussion for other reasons, such as a high level of public input, lack of clarity in the analysis report, or concerns resulting from the previous determination for the Nass TSA. As a result, I may choose to provide my consideration of such factors in this rationale.

I have considered the reasoning used to select the base case forecast and I am satisfied that it provides a suitable basis from which to evaluate the assumptions regarding land base, management practices, and timber yields for the Nass TSA.

Consideration of factors as required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

Land base contributing to timber harvesting

- general comments

As part of the process used to define the timber harvesting land base in the timber supply analysis, a series of deductions are made from the productive forest land base. These deductions account for the factors that effectively reduce the suitability or availability of the productive forest area for harvest, for ecological, economic or social reasons. In the Nass TSA, the deductions (summarized in Table 2 of the *June 2001 Nass Timber Supply Area Analysis Report*) result in a timber harvesting land base of 189 174 hectares, which is about 30 percent of the Crown productive forest land.

I have considered all of the deductions applied in the derivation of the timber harvesting land base for the Nass TSA. Those factors associated with deriving the timber harvesting land base as applied in the analysis that I accept based on my thorough review are not discussed below. These factors include environmentally sensitive areas, low-productivity sites, and estimates for roads, landings, and trails.

Where my consideration of the information has identified a factor which in my estimation requires discussion in this document, it is described below.

- Upper Nass

The Upper Nass covers a total of about 455 626 hectares, of which 156 773 hectares are classified as productive forest land. For the purposes of the base case forecast, the Upper Nass was excluded from the timber harvesting land base.

Results of a sensitivity analysis showed that even if the Upper Nass timber harvesting land base was included in the base case forecast, an initial harvest level based on the current AAC (1 142 000 cubic metres) could not be achieved without a decrease in the mid-term timber supply below the steady long-term harvest level. To avoid the mid-term decline, the initial harvest level would be 1 059 000 cubic metres per year, or 7 percent lower than the current AAC. Therefore, the Upper Nass could contribute up to 239 000 cubic metres per year—the difference between the base case forecast of 820 000 cubic metres per year and the forecast of 1 059 000 cubic metres per year, which includes the Upper Nass.

In the previous timber supply analysis, the area of the Upper Nass contributed 18 percent to both the standing merchantable timber inventory and the timber harvesting land base. In my 1995 AAC determination, I noted that licensees had not initiated development into the Upper Nass and that any inability to access the Upper Nass in the future had serious implications for the short- and long-term timber supply. Therefore, I asked that BCFS district staff examine the likely extent to which the Upper Nass area would be accessible and economically feasible for timber harvesting.

In 1997, BCFS district staff contracted Sterling Wood Group Incorporated ("Sterling Wood") to review the physical operability and to investigate alternative access routes into the Upper Nass.

Based on revised operability as outlined in the Sterling Wood report, entitled *Nass TSA Chart Area Analysis – Upper Nass Development Feasibility Study* (January 1998),

including the Upper Nass in the base case forecast would increase the size of the timber harvesting land base by 60 117 hectares. The report also identified and examined the feasibility and construction costs of three alternative access routes. The estimated total cost of construction for the least expensive route was estimated to be about 19.7 million dollars.

The results of the study indicate that there are high operating costs associated with accessing the Upper Nass. BCFS district staff are concerned about the economic viability of operating in this area and note that to date, there has been no development or harvesting in this area. District staff indicate that many factors may be influencing development including: lack of infrastructure, forest health concerns, poor market conditions, and regeneration constraints. These factors are discussed below.

1) infrastructure

According to BCFS district staff, the licensees currently operating in the Nass TSA have indicated that at present they can not justify the expenditure required to construct the infrastructure to access the predominantly marginal timber in the Upper Nass. During 1998 to 2000, licensees submitted proposals to government requesting funding for access development, however no government funding was approved. The BCFS Small Business Forest Enterprise Program (SBFEP) has considered access in the Upper Nass, and in 2001, road construction was initiated towards the Upper Nass. However, a review of the associated construction costs indicated that a return of 30 dollars per cubic metre of wood harvested is required to recover the cost of construction. District staff indicated that continued road construction by SBFEP is unlikely due to the projected construction costs.

2) forest health concerns

Forests in the Upper Nass predominately consist of mature balsam stands that are susceptible to balsam bark beetle attack. BCFS district staff, based upon their review of 1996 satellite imagery of the Upper Nass and ongoing forest health monitoring, indicate that the bark beetle infestation is continuing and that the susceptible mature balsam stands are subject to higher levels of mortality than stands in the Lower Nass.

During an overview flight of the area, I observed high mortality and an associated loss of about 20 percent of mature balsam volume due to the bark beetle infestation. A sensitivity analysis examined the timber supply implications of reducing the existing stand volume contribution (from the analysis units dominated by balsam) in the Upper Nass by 20 percent. The results showed a 30-percent timber supply reduction from the Upper Nass's contribution over the next six decades. I have considered the implications of this forest health concern as noted below in this section.

3) poor market conditions

BCFS district staff indicate that even with the provision of an existing log export permit, which was approved by order in council in 1985, harvesting in the Lower Nass is marginally economic. Furthermore, staff note that under current market conditions the balsam stands, which predominate the Upper Nass, are not desirable for the manufacturing of pulp or dimensional lumber. District staff believe the limited demand for harvesting

balsam as demonstrated in the Lower Nass indicates that it is unlikely that development will proceed into the Upper Nass in the near future.

4) regeneration constraints

BCFS district staff express concern regarding the potential application of a clearcut silvicultural system in the Upper Nass, which is the predominant silvicultural system in use in the Nass TSA. They indicate that the harsh climatic conditions, and the mid- to high-elevation at which productive stands occur, combined with the long, deep valleys that cut through the Upper Nass, make successful, economical reforestation within an acceptable time frame very uncertain. They suggest that an alternative silvicultural system that mimics natural stand development may be more appropriate to maintain site occupancy, stand structure, and thereby minimize any microclimatic shifts that may occur after clearcutting. However, district staff believe that further research on the biology and implementation of such an alternative silvicultural practice is needed.

The Regional District of Kitimat-Stikine (Regional District) supported the exclusion of the Upper Nass in the base case forecast, provided that this issue was revisited during each timber supply review. The Regional District also suggested that harvesting in the Upper Nass could become viable given provincial government economic development policies permitting log exports, and assistance with road construction or other employment development programs.

The District of Stewart indicated that exclusion of areas with economically marginal wood and decreasing the size of licences would decrease profitability. This in turn would affect funding available to access marginal wood and the number of jobs in the area. In another submission, one licensee indicated that they are opposed to reducing the timber harvesting land base due to excluding the Upper Nass. They are supportive of partitioning the AAC between the Upper and Lower Nass.

In review of the above noted concerns, firstly I am mindful that the sensitivity analysis indicates that even if the Upper Nass is included in the timber harvesting land base, the current AAC cannot be maintained. Secondly, I acknowledge the district staff's concerns regarding the economic viability of development in the Upper Nass. This is partially substantiated by the fact that the area has yet to be developed, even with the incentives provided by the existing log export permit for the Nass TSA. However, in the future harvesting the accessible Lower Nass under more favourable economic conditions could offset the high costs associated with development and operations in the Upper Nass.

In summary, based upon my review of the information presented to me, which included an on-site field examination of the stands in the Upper Nass, I am not certain that the Upper Nass should be excluded from the timber harvesting land base. In many circumstances like this one, I have found it reasonable to examine the risk to timber supply from this type of uncertainty and specify a partitioned harvest level for areas within a TSA. For the Nass TSA, a partition for the Upper Nass will help to ensure that harvesting to the full extent permitted by the AAC will not be concentrated in the adjacent accessible Lower Nass area. While I note the significant amount of uncertainty regarding this area, the Upper Nass nonetheless has the potential to greatly offset future declines in timber supply for the Nass

TSA. I have also considered the timber supply impact from the balsam bark beetle infestation to represent a risk that the timber supply from this area may be overestimated by up to 30 percent—relative to the harvest level forecast for the Upper Nass's contribution of 239 000 cubic metres per year—in the short and mid term. Therefore for this determination, I have taken into account the timber supply implications of this potential volume overestimation, and I have also established a partition for the Upper Nass, and I will discuss this further in 'Reasons for decision'.

- economic and physical operability

Those portions of the Nass TSA, which have been confirmed as either not physically accessible or not economically feasible to harvest are categorized as inoperable and have been excluded from the timber harvesting land base.

BCFS district staff reviewed and accepted the 1989 operability mapping of the Nass TSA, which was based on air photo interpretation. Based upon 1989 operability mapping, 234 721 hectares of inoperable productive forest were excluded from the timber harvesting land base for the Lower Nass.

At the time of the 1995 AAC determination, I was concerned that only 13 percent of the logged area was being harvested using cable systems, whereas the analysis assumed cable harvesting on about 50 percent of the timber harvesting land base. Therefore, I instructed BCFS district staff to continue to monitor harvesting activities to ensure that harvesting of areas classified as operable for cable systems was more closely proportionate to the amount of cable area assumed to be harvested in the analysis. At that time, I also indicated that the large discrepancy between the distribution of past harvest and the operability classification would be reviewed at the time of this determination, and that a partition may be considered based on different types of terrain by harvesting systems.

In response to my instruction, BCFS district staff monitored the performance of all licensees in the Nass TSA. The results showed that during the period of January 1, 1996 to June 30, 2000, about 62 percent of the total volume was harvested using ground-based systems and 38 percent was harvested using cable systems. BCFS district staff indicate that the current level of cable harvesting correlates reasonably well within the area assumed to be harvested using cable systems in the analysis.

In conclusion, I am satisfied that the current level of performance in stands assumed to be harvested using cable systems is generally proportional to their occurrence in the timber harvesting land base. Nonetheless, in view of the risk of concentrating harvesting activities in areas classified as ground-based systems, I encourage BCFS district staff to continue to monitor harvesting activities to ensure that harvesting using cable systems continues to be proportionate to the assumed contribution of these areas to the timber harvesting land base. For this determination, I make no adjustments on account of this factor.

- problem forest types

Problem forest types are typically defined as stands that are physically operable and exceed low site criteria and yet are not currently utilized, or have marginal merchantability, or are avoided due to regeneration difficulties. Typical stand characteristics may include the

following: small size, small diameter, lack of merchantable stems per hectare, or lack of merchantable volume. This definition is based on economic criteria, for the purpose of defining the operable land base and does not imply that these types of forests are not important in terms of their role and function on the ecosystem.

In the timber supply analysis, problem forest types that were excluded from the timber harvesting land base were defined as follows:

- western hemlock and balsam stands greater than 27.5 centimetres diameter at breast height (dbh) and less than 76 trees per hectare;
- open stands greater than or equal to 61 years of age with a crown closure of less than or equal to 35 percent;
- all deciduous stands; and
- small, densely-stocked lodgepole pine stands.

In total, to account for the area occupied by problem forest types, 104 977 hectares were excluded from the timber harvesting land base.

Input from the Regional District of Kitimat-Stikine encouraged utilization of alternative timber types, although they recognize that deciduous species are in limited supply. I note that there has been no past harvesting of leading-deciduous stands in the Nass TSA and at present there is no local demand for deciduous species. Therefore for this determination, I conclude that it is reasonable to exclude these stands from the timber harvesting land base. However, if there is an increased interest in harvesting deciduous trees and a demonstrated demand in the future, then this can be considered in subsequent determinations.

Overall, the criterion used for identifying problem forest types seems reasonable. However, I have some concerns about the assumed full timber supply contribution of hemlock and balsam stands greater than 141 years of age that were not at least partially considered as problem forest types. In these stands, which dominate the forests in the Nass TSA, there is generally a higher quantity of pulp quality wood, making these stands marginally merchantable. Furthermore, wood quality in these stands continues to decline as the stands age. Although the exact reduction—in addition to the existing decay and waste factors applied in the analysis—to account for the unmerchantable volume associated with these stands is uncertain, it is reasonable to expect that some of these stands are not currently merchantable and that the volume attributable to these stands will continue to decrease over time. Therefore, the volume contribution from leading-hemlock and -balsam stands greater than 141 years of age to the base case forecast may be overestimated. I have considered this to represent an unquantified downward pressure on the short- and long-term timber supply as discussed in 'Reasons for decision'.

I encourage BCFS district staff to examine the criteria for problem forest types prior to the next determination for the Nass TSA.

- TSA boundary change

In 1999, the district managers for the North Coast and Kalum Forest Districts formalized a transfer of lands from the Kalum TSA to the North Coast TSA, and from the North Coast TSA to the Nass TSA. The order-in-council for the TSA boundary changes was officially designated on January 28, 2000, and signed by the Minister of Forests in June 2000.

These boundary changes resulted in the transfer of 91 938 hectares from the North Coast TSA to the Nass TSA. BCFS staff indicate that the boundary changes formalize operational practices, which have been in existence for some time. The area in the North Coast TSA has been managed for several years from the field office located in Stewart, as part of the Nass TSA.

At the time the timber supply analysis was initiated, the official transfer of land was not completed and therefore the area transferred from the North Coast TSA was not included in the base case forecast for the Nass TSA. BCFS staff state that an additional 1667 hectares should be included in the timber harvesting land base for the Nass TSA, which is an increase of less than one percent (0.8 percent).

For this determination, I have accounted for this slight underestimation, which affects the short- and long-term timber supply, as discussed in 'Reasons for decision'.

- protected areas

In 1993, the *Protected Areas Strategy* (PAS) *for British Columbia* was released. The strategy has two goals: representation (Goal 1) which is aimed at protecting viable examples of the natural diversity of the province, and special features (Goal 2) which is aimed at protecting special natural, or cultural heritage and recreational features of the province.

Under the PAS, a number of Goal 1 and Goal 2 'study' areas were designated for each eco-region of the province. As part of the strategy, it was anticipated that final recommendations regarding the study areas would result from public planning processes such as a land and resource management plan (LRMP) or similar types of planning processes in each region.

In the Nass TSA, there are two Goal 1 and four Goal 2 study areas covering a total of 62 492 hectares. Operationally, these study areas have been deferred from harvesting or any other resource activities since 1993. The long-term status of these study areas is expected to be addressed in a future LRMP and at the time of this determination, none of the areas has been officially designated as protected areas.

Within the study areas, about 2500 hectares and 13 000 hectares of timber harvesting land base is estimated to be in the Lower Nass and Upper Nass, respectively. The former is included in the base case forecast, and the latter is excluded along with the whole of the Upper Nass. A sensitivity analysis around the harvest forecasts for the combined land base of the Upper and Lower Nass, which examined the impact on timber supply of removing these areas from the combined timber harvesting land base, showed a 6-percent impact to

the short- and long-term timber supply. District staff confirmed that no harvesting is occurring in any of the study areas.

For this determination, I am mindful that government has not yet made any decision regarding the official status of the Goal 1 and Goal 2 study areas in the Nass TSA. In keeping with my guiding principles, I consider it inappropriate to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. As a result, I will make no adjustments in this determination regarding protected areas. Any change in the status of the study areas can be incorporated into subsequent timber supply reviews. In the interim, I am confident that these areas are being managed in a manner that is consistent with their potential future status as protected areas.

- Nisga'a Lands

The Nisga'a Final Agreement, which became effective on May 11, 2000, resulted in the ownership transfer of 28 754 hectares from the Nass TSA to the Nisga'a First Nation (Nisga'a) to become part of the 'Nisga'a Lands'. These lands were previously part of the Nass TSA, as well as the Kalum and North Coast TSAs, and TFL 1.

In May 2000, under the authority of Part 14 of the *Forest Act*, I reduced the AAC for the Nass TSA by 7600 cubic metres to account for the timber supply impact of the transfer in ownership of land and forest resources to the Nisga'a First Nation.

The final agreement was in effect when the timber supply analysis was initiated, therefore 28 754 hectares were excluded from the Nass TSA. However, an additional 85 hectares of Nisga'a fee simple sites, which consist of productive forest land located throughout the Nass TSA, were not excluded from the timber harvesting land base.

I am mindful that the 85 hectares of Nisga'a fee simple sites should have been excluded from contributing to the timber supply projected in the base case, and I have accounted for this in my determination, as discussed in 'Reasons for decision'.

Existing forest inventory

The inventory data used for the timber supply analysis is based on a forest inventory of the Nass TSA completed in 1990. The inventory file was updated to 1996 to account for changes in ownership, growth, and denudation due to harvesting or fire. For the analysis, forest attributes were projected to December 31, 1998.

I have considered the information regarding the current forest inventory and I am satisfied, subject to any discussion under the following factors, that the compiled inventory file used in the timber supply analysis forms a suitable basis upon which to make my determination.

- volume estimates for existing stands

Volumes for existing natural stands were estimated and projected using forest inventory attributes and the Variable Density Yield Prediction 6.5 (VDYP) model, which was developed by the former BCFS Resources Inventory Branch.

In my 1995 AAC determination for the Nass TSA, due to concerns about volume estimates for existing stands, I requested that an inventory volume audit be completed. Since then, inventory audits were completed in 1996 for the Upper Nass and the Lower Nass. The audits reviewed mature timber volumes, immature site index, and non-forest classification. The results indicated that existing stand volumes as reported in the inventory data are statistically reasonable.

The Lower Nass audit estimated that the mean mature volume is about 403 cubic metres per hectare and the inventory data estimated that the mean mature volume is about 404 cubic metres per hectare. The estimated mean merchantable volume of mature timber assumed in the base case forecast is 409 cubic metres per hectare.

Although the audit results indicated that the inventory volumes are statistically reasonable, BCFS district staff are nonetheless still concerned that the mature volumes have been over-estimated in the forest inventory and the timber supply analysis. Based upon information from cruise and scaled/billed volume reports (collected from the Lower Nass), district staff indicate that the actual merchantable volumes seem to be considerably lower. District staff examined 41 cruise reports in the SBFEP charted area for the period 1996 to 1999 and found that the volume per hectare scheduled for harvesting was on average about 283 cubic metres per hectare. Although no public input regarding this specific matter was received, local operators have suggested that an average of 400 cubic metres per hectare of merchantable volume is not likely attainable in the Nass TSA.

Over the next several decades, the base case forecast is very sensitive to changes in the estimate of existing mature timber. A sensitivity analysis that examined the impact of overestimating existing stand volumes by 10 percent, resulted in a 16-percent reduction to the initial base case harvest level.

I acknowledge BCFS district staff's concerns regarding the estimates of existing stand volumes. However, I note that the results of the two inventory audits do not substantiate an overestimation of stand volumes. The operational cruise and scale data that were compared with the volumes projected in the analysis are taken from a limited time frame, and the results could be influenced by other factors, such as actual versus assumed utilization, and differences in the sampled and overall average mix of species and sites. Nonetheless, based upon my review of the information, including the results of the sensitivity analysis, I am aware that any potential overestimation in existing stand volume represents a significant risk to the short- and mid-term timber supply. For this determination, I have considered the risk of an unquantified overestimation in timber supply as discussed under 'Reasons for decision'.

I strongly encourage ongoing critical review of this matter, and will examine any new data and reassess ongoing operational experience at the time of the next AAC determination.

Expected rate of growth

I have reviewed the information regarding minimum harvestable ages and projected volumes for managed stands, including genetic gain in lodgepole pine associated with the use of class A seed for reforestation, and the operational adjustment factors that were

applied to reduce the yield estimates of managed stands. I am satisfied that the analysis assumptions were appropriate in this regard, and I will not discuss my considerations in detail in this rationale.

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand. Site productivity is expressed in terms of a site index, which is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow, which in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced, and the age at which a stand will reach a merchantable size.

In general, in British Columbia, site indices determined from younger stands (i.e., less than 31 years old), and older stands (i.e., over 150 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been subject to management of stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This has been verified in several areas of the province where studies—such as the Old-Growth Site Index (OGSI) 'paired plot' and the 'veteran' project—as well as results from using the Site Index Biogeoclimatic Ecosystem Classification System (SIBEC) suggest that actual site indices may be higher than those indicated by existing data from old-growth forests. Such studies indicate that site productivity has generally been underestimated by the inventory file data; managed stands tend to grow faster than projected by inventory-based site index estimates from old-growth stands.

In the previous AAC determination, I requested that staff undertake a site productivity study to examine productivity in the Nass TSA. However, no local site index studies have yet been conducted in the Nass TSA. A sensitivity analysis tested the impact to timber supply if site productivity was assumed to be at the level suggested by the provincial OGSI studies. The sensitivity analysis showed that if the site indices of all stands older than 140 years (which cover 71 percent of the timber harvesting land base) were adjusted using the provincial OGSI data, the long-term harvest level increased from 407 000 cubic metres per year to 642 000 cubic metres per year (representing a 57-percent increase in the long-term level), and further the level was reached after only 3 decades. In the sensitivity analysis, increasing site productivity also decreased the average time required to achieve green-up height for visual and integrated resource management zones by 7.8 years, and decreased the average minimum harvestable age by 50 years.

A paired-plot study was conducted in the adjacent Kalum TSA and resulted in a site index increase of 11 metres for western hemlock stands in the timber supply analysis for that TSA. Based on this experience, district staff believe that the site productivity of managed stands in the Nass TSA has likely also been underestimated. This is substantiated by species trials that are showing increased height growth in the Nass TSA based on the selection of alternate trees species for reforestation of poorer sites. Staff indicate that if the results of the Kalum TSA study were applicable to the stands in the Nass TSA, it could result in a 92-percent increase to the long-term harvest level.

Data from the paired-plot study, and the study in the adjacent TSA, clearly demonstrates that actual stands elsewhere in the province are growing at a much faster rate than would be expected based on measurements from the standing old-growth inventory. However, I am mindful of the implications of the concerns identified under *impediments to prompt regeneration*, which may affect the capacity of some of the managed stands in the TSA to achieve full stocking and in the timelines modelled in the sensitivity analysis. Given existing silvicultural requirements, it is reasonable to expect that full stocking will occur in the majority of managed stands in the Nass TSA, and that the majority of stands will be managed to minimize losses to pests and competing vegetation. I believe it is reasonable to expect that most second-growth stands will have a higher productivity than currently estimated from old-growth stands. However, I consider that some caution applies in terms of how much weight to place on the more optimistic yields indicated by the site productivity sensitivity analyses.

I note that local data will provide much needed certainty around the magnitude of site productivity adjustments appropriate for the Nass TSA, and I strongly encourage the collection of data from stands within the TSA over the term of this determination. For this determination, I have considered the implications of a potential underestimation of timber supply in the mid- to long-term, the exact magnitude of which is subject to some uncertainty. I will discuss my considerations of this further under 'Reasons for decision'.

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

Expected time for the forest to be re-established following harvest

- regeneration delay

Regeneration delay is the period between harvesting and the time at which the harvested area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In the timber supply analysis, it was assumed that all harvested areas will be planted and that regeneration delay is about three years for all species.

BCFS staff reviewed silviculture prescriptions and confirm that the average regeneration delay is three years. However, they note that more recent records indicate that regeneration is occurring in less than three years.

Based upon my review of the information and discussions with BCFS district staff, I am satisfied that the three year regeneration delay assumed in the base case forecast represents the best available information and is adequate for use in this determination. I encourage district staff to continue to monitor actual regeneration delay over the term of this determination. If the recent trend of decreasing regeneration delay periods continues, this information can be incorporated into the timber supply analysis for the next determination.

- impediments to prompt regeneration

In the Nass TSA, impediments may include such factors as geoclimatic conditions or damage from insects, diseases, and mammals. In the previous AAC determination, I requested that BCFS staff continue to examine the extent to which climatic conditions,

particularly in the northern portion of the Nass TSA, hinder prompt and successful regeneration, as to ensure application of appropriate silvicultural systems and, if necessary to adjust factors in this determination.

In response to this request, BCFS district staff initiated a study to examine the impact of silvicultural systems on regeneration and regeneration difficulties in the Interior Cedar Hemlock (ICH) biogeoclimatic zone, which is the most prevalent biogeoclimatic zone in the Nass TSA. In addition, district staff reviewed two reports; one prepared by the BCFS Forest Practices Branch that addresses regeneration difficulty in the ICH biogeoclimatic zone, and the second report prepared by the BCFS Regional Research Ecologist on the ecology of the Nass TSA.

The results of these reports indicate that scheduling of silviculture treatments is critical in the success and cost of regeneration, particularly on the more difficult sites. They also indicate that regeneration challenges have been exacerbated by climatic factors, active forest pests, and vigorous vegetative competition. These reports indicate that improvement and opportunities with respect to site preparation, species selection, management of pests, stocking standards, the availability of Class 'A' seed, and the practice of alternative silvicultural systems need to be explored in greater detail.

District staff indicate that as well as difficulties in stand establishment on some sites, they are experiencing the failure of some lodgepole pine plantations due to an increased incidence of Warren's root collar weevil, Northern pitch twig moth, Commandra blister rust, and Dothistroma needle blight. They note that the current timber supply analysis may not include specific adjustments to account for possible volume or density losses due to these infestations in managed stands. However, it is uncertain how the operational adjustment factors already applied in the analysis may overlap and account for these endemic losses.

I have reviewed and discussed the information regarding impediments to prompt regeneration with BCFS district staff, and while I acknowledge that there are challenges regenerating some sites in the Nass TSA, I am satisfied that the assumptions used in the base case forecast were based upon the best available information. Nonetheless, I am concerned about the limited experience regenerating some of the more difficult sites that are included in the timber harvesting land base but are not yet harvested, and the continued viability of some of the existing plantations, particularly lodgepole pine. Therefore, I encourage staff to continue to monitor silviculture treatments, assess the stocking levels of plantations that could potentially fail and continue to study the extent to which the use of alternative silvicultural systems will reduce any regeneration difficulties encountered on some sites in the Nass TSA.

- not-satisfactorily-restocked areas

Not-satisfactorily-restocked (NSR) areas are those areas where timber has been removed, either by harvesting or by natural causes, and a stand of suitable tree species has not yet been fully re-established.

In the timber supply analysis, 18 437 hectares of NSR that are not scheduled to be restocked were identified and excluded from the timber harvesting land base. These areas

include some older wildfire areas, and NSR areas that are over 30 years old or with no harvest history or data. Another 18 134 hectares of NSR which originated more than 30 years ago were included in the timber harvesting land base, as these areas are projected to be fully restocked over time.

On the basis of a 2001 report prepared by the BCFS Forest Practices Branch, entitled *Summary of Backlog NSR and Impeded Forest Land*, 3192 hectares of NSR that were included as restocked over time in the timber harvesting land base may not be fully restocked to managed stand standards. District staff concur with the report and indicate that due to lack of funding for treatment, it is unlikely that these sites will be restocked to full productivity in the future. On the other hand, staff indicate that some areas of the old burns and some areas without harvesting history information that were excluded from the timber harvesting land base may already be restocked, but likely have lower stocking levels than managed stand standards.

Based upon my review, I conclude that 3192 hectares of NSR areas are not likely to be fully restocked as reflected in the base case forecast. If stocking levels are only half that of those reflected in current stocking standards on the 3192 hectares of NSR, then this represents an up to 1-percent overestimation in the mid- to long-term harvest level as projected in the base case forecast, and I have accounted for this in my determination, as discussed in 'Reasons for decision'.

In regards to the 18 437 hectares of NSR that are not expected to become satisfactorily restocked and that were hence excluded from the timber harvesting land base, I believe that until such time that data is available to verify the stocking, its is reasonable to exclude these areas from the timber harvesting land base.

I encourage BCFS district staff to continue to assess the stocking of NSR sites and their ability to reforest within the parameters reflected in the analysis, in particular old burns and areas with no harvesting history, as these areas could contribute to the timber harvesting land base over time.

(iii) silviculture treatments to be applied to the area,

Silvicultural treatments to be applied

I have reviewed the information regarding silvicultural systems and silviculture treatments and I am satisfied that the base case assumptions for these factors were appropriate.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

Timber harvesting

I have reviewed the information regarding the utilization standards and the decay, waste and breakage factors assumed in the analysis for the Nass TSA, and I am satisfied that these factors were appropriately modelled in the analysis.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production,

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water quality and aesthetics, current harvesting practices limit the size and shape of cutblocks and amount of disturbance (areas covered by stands of less than a specified height), and prescribe minimum green-up heights for regenerated stands on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

I have reviewed the information regarding recreation and cultural heritage resources and community watersheds and I am satisfied that the base case assumptions for these factors were appropriate.

- *cutblock adjacency/green-up*

Objectives for forest cover and cutblock adjacency guide harvesting practices in order to address resource values such as wildlife, water, and visual quality. The adjacency objectives modelled in the analysis address minimum green-up height required before an adjacent area may be harvested, and the maximum area permitted to be less than the minimum green-up height. The FSSIM timber supply analysis model does not represent adjacency objectives explicitly. Rather, in timber supply analysis adjacency is modelled implicitly through forest cover objectives, which limit the amount of area on which trees may be below a specified green-up height.

In my 1995 AAC determination, I encouraged district staff to review their assumptions regarding the amount of permissible disturbance, i.e. - number of harvest passes and the time required for an area to achieve a greened-up condition to meet IRM objectives.

Since then, district staff have examined these assumptions for the purposes of this timber supply review. To reflect operational constraints in the IRM zone, the amount of disturbance was limited to a maximum of 35 percent of the stands on the timber harvesting land base (by landscape unit) permitted to be less than 3 metres in height at any time. BCFS district staff indicate that current disturbance levels in the Nass TSA range from 35 percent to 50 percent. The results of a sensitivity analysis show no impact to timber supply from increasing the amount of disturbance in the IRM zone by 15 percent.

In the IRM zone, the analysis indicates that the time required for a stand to achieve a green-up height of 3 metres ranged from 22 to 27 years. District staff confirm that these green-up ages seem reasonable based on their observations in the field. Furthermore, they note that these green-up ages fall within the ranges reported in the silvicultural records.

I am satisfied that the assumptions used in the base case forecast for cutblock adjacency and green-up are consistent with current practice in the Nass TSA, and are therefore appropriate for use in this determination.

- visually sensitive areas

Careful management of scenic areas along travel corridors and near recreational sites is an important IRM objective. The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known by the district manager or through a higher level plan, and by providing for the establishment of visual quality objectives (VQOs). A visual landscape inventory identifies, classifies and records visually sensitive areas within a landscape. Using such an inventory, recommended visual quality classes (RVQCs) of preservation, retention, partial retention or modification may be derived to guide operational practices. These RVQCs may become established VQOs as determined by the district manager or through a higher level plan.

Management for visual quality applies to the Crown-owned forested land within scenic areas. In the Nass TSA, scenic areas with established RVQCs were officially made known by the district manager in January 1997. These scenic areas, which occur along Highway 37 and 37A in the Nass TSA, represent approximately 14 percent of the timber harvesting land base. Within these scenic areas, there is a range (by VQO class) of maximum permissible disturbance limits at any time.

BCFS district staff indicate that current practice in the Nass TSA allows the maximum permissible level within each of the disturbance ranges. Therefore, district staff concur with the use of forest cover objectives in the base case forecast that reflect the maximum level of disturbance for each of the VQO classes. Staff note that on occasion, licensees with demonstrated good visual design techniques (i.e., meet the VQO) have been permitted to exceed the maximum "plan view" disturbance guidelines.

I have reviewed and discussed the information regarding visually sensitive areas with BCFS district staff and I am satisfied that the assumptions used in the base case forecast are consistent with current practice in the Nass TSA, and are therefore appropriate for use in this determination. I note that district staff have indicated that it has been possible to exceed maximum disturbance guidelines with good visual design. I encourage staff to monitor the extent to which this is possible during the term of this determination so that any appropriate adjustments can be incorporated into the next determination.

- riparian habitat

Riparian habitat occurs along streams and around lakes and wetlands. The Forest Practices Code requires the establishment of riparian reserve zones (RRZs) that exclude timber harvesting, and riparian management zones (RMZs) that restrict timber harvesting, in order to protect riparian and aquatic habitats. Various classes (e.g. S1) described in the *Riparian*

Management Area Guidebook are determined based on presence of fish, occurrence in a community watershed and average channel width criteria. The classes are used to estimate the size of RRZs and RMZs.

A stream inventory has not been completed for the Nass TSA. Therefore, for the purposes of the timber supply analysis, BCFS staff and specialists selected 12 representative mapsheets to determine a sample estimate of the riparian reserve and management zones. From this sample, an extrapolation was applied to the remaining TSA. This approach resulted in the exclusion of 4235 hectares or approximately 2 percent of the timber harvesting land base to account for the riparian reserve zones and riparian management zones of S1 to S3 streams.

BCFS district staff indicate that the assumptions used in the analysis reasonably represent riparian management practices in the Nass TSA. However, the sample did not include stream classes S4 to S6. Many of these riparian management zones are outside of the block boundaries as they are generally avoided during cutblock layout.

Based upon my review of the methodology used in the analysis to account for management practices in riparian habitat, I am satisfied that stream classes S1 to S3 were modelled appropriately in the base case forecast. However, for stream classes S4 to S6, it is likely that some additional reduction is required to account for management practices in this type of riparian habitat. Therefore, for this determination, I have considered the risk of an unquantified overestimation of the timber supply, as discussed in 'Reasons for decision'.

I encourage district staff to continue to monitor riparian management and refine the methodology for determining the amount of retention, particularly for the S4 streams in order to ensure that this is reflected more accurately in the next timber supply analysis.

- wildlife habitat and identified wildlife

The Nass TSA is inhabited by many wildlife species, including moose, mountain goat, grizzly and black bear, and a variety of small mammals and birds. No specific forest cover objectives were applied in the timber supply analysis to account for wildlife habitat, except for the land base reductions associated with areas identified on forest cover maps as having high wildlife value (ESA - w).

Under the *Forest Practices Code of British Columbia Act*, identified wildlife are those wildlife species that have been approved by the chief forester and deputy minister of Environment, Lands and Parks or designate as requiring special management. Volume I of the province's Identified Wildlife Management Strategy (IWMS) for dealing with endangered, threatened, vulnerable, and regionally significant species, which have not been accounted for with existing management strategies—such as those for biodiversity, riparian management, ungulate winter range or through the application of other forest cover constraints—was announced on February 19, 1999. The intent is that by addressing the habitat needs of 'regionally important wildlife' early on, the possibility that they will become listed provincially as threatened or endangered at a later date may be avoided.

Volume I of the IWMS details several species which may occur or potentially occur in the Nass TSA (as part of the Kalum Forest District), and which require future consideration,

including the following: bull trout, tailed frog, trumpeter swan, northern goshawk, marbled murrelet, fisher, grizzly bear, and mountain goat. Volume II, which has yet to be released, may identify additional species. The species identified in Volume I will be managed through the establishment of wildlife habitat areas (WHAs) and implementation of general wildlife measures, or through other management practices specified in higher level plans.

Based on data accumulated on the habitat requirements for the identified species, the estimated impact of management has been projected at one percent of the short-term harvest level for the province. Government has committed to limiting the impact of management for identified wildlife to this level in the short term.

No WHAs have been established in the Nass TSA. When WHAs are established and general wildlife measures are implemented, the effectiveness of the management for identified wildlife and any associated timber impact will be much clearer. These measures are expected to be assessed over time to ensure they are sufficient to adequately protect identified wildlife species.

It is not possible in this determination to specify the exact location or precise amount of additional habitat area that will be required within the timber harvesting land base to implement the IWMS. However, given the province's commitment both to implement the IWMS, and to limit short-term timber supply impacts to one percent province-wide, as well as the expected occurrence of identified wildlife in this TSA, I find it appropriate to account for an up to one-percent impact on timber supply, and I will discuss this further under 'Reasons for decision'.

I encourage the appropriate staff to work together to identify and establish WHAs prior to the next determination for the Nass TSA. The establishment of these areas is a significant protective measure of the Forest Practices Code, and will assist with long-term planning and reduce operational conflicts between wildlife and harvesting.

- botanical forest products

Pine mushroom harvesting is unregulated and in recent years these mushrooms have attracted much attention due to their high value on the Japanese market. The pine mushroom is considered the most economically important wild mushroom species harvested in the province. Northwestern BC is known as having some of the most highly productive pine mushroom habitat in the province and localized harvesting of pine mushrooms is an important economic and recreational activity in the Nass TSA.

Typically, pine mushroom habitat occurs in forests that are between 75 and 200 years old on sites that are well-drained and that have nutrient poor soils in the ICH biogeoclimatic zone. This habitat is located primarily in the timber harvesting area assigned to the BCFS Small Business Forest Enterprise Program (SBFEP). SBFEP staff indicate that where possible wildlife tree patches (see *stand-level biodiversity*) are strategically placed or cutblock boundaries are revised to conserve prime mushroom habitat. SBFEP staff are exploring options other than clearcutting in an attempt to manage for pine mushroom habitat.

Management of pine mushroom habitat was not reflected in the base case forecast. However, a sensitivity analysis was conducted to assess the impact on timber supply of managing for pine mushroom habitat, which covers an estimated 5250 hectares (mapped prime mushroom habitat) on the timber harvesting land base. On this area, the minimum harvestable age was increased to a minimum of 200 years and resulted in decreased timber supply of 3000 cubic metres per year for the first decade, followed by similar declines as in the base case before reaching a long-term harvest level of 404 000 cubic metres per year, which is 3000 cubic metres per year below the base case long-term level.

The precise location of all the prime pine mushroom habitat is unknown. District staff note that there may be some degree of overlap with wildlife tree patches, and that where possible cutblock boundaries are being placed to avoid known prime mushroom habitat. However, I note that it is unlikely that all prime mushroom habitat will overlap and be accounted for within wildlife tree patches, and in any event there was no accounting for wildlife tree patches in the base case forecast, which I have discussed in the next factor. I am mindful that the sensitivity analysis indicates the short- and long-term timber supply is sensitive to increased minimum harvestable ages, which is an attempt to reflect the best understanding of a possible management strategy for pine mushroom habitat.

I note that pine mushrooms and other botanical forest products have been considered for regulation under the Forest Practices Code, however at present these is no management regime required for botanical forest products. For this determination, I have considered the risk to timber supply as representing an unquantified downward pressure as discussed below, in 'Reasons for decision'.

- stand-level biodiversity

Biodiversity is defined as the full range of living organisms, in all their forms and levels of organization, and includes the diversity of genes, species and ecosystems and the evolutionary and functional processes that link them. Under the Forest Practices Code, biodiversity in a given management unit is assessed and managed at both the stand and landscape levels.

Management for stand-level biodiversity includes retaining wildlife trees and patches (WTPs), within or adjacent to cutblocks to provide structural diversity and wildlife habitat.

Wildlife tree patch retention targets were developed by the Ministry of Forests and the former Ministry of Environment, Lands and Parks staff using Tables 20a and 20b of the *Biodiversity Guidebook* (equivalent to Tables A3.1. and A3.2 in the *Landscape Unit Planning Guide)*. The guidebook specifies for each draft landscape unit two wildlife tree patch retention targets — one for when landscape units are in place (20a) and one for when they are not (20b). Operationally, district staff are applying targets based on Table 20b.

In most timber supply analyses for TSAs, stand-level retention targets are based on using Table 20a because forest cover requirements are also applied for landscape-level biodiversity in the base case forecasts. Although this is a departure from operational practices, it is expected that the timber supply analysis recognize the Forest Practices Code which sets out requirements for stand- and landscape-level biodiversity.

In the Nass base case forecast, forests outside the timber harvesting land base were assumed to meet all of the requirements for WTPs, which totalled 8730 hectares. Within all landscape units and subzones, the area of forest outside of the timber harvesting land base was at least double the retention targets required for WTPs.

Since the preparation of the data for timber supply analysis, district staff have obtained new information regarding the retention of WTPs in the Nass TSA. Staff note that current practices often place WTPs adjacent to cutblock boundaries. In other cases, they indicate that some forested areas are being retained within cutblocks. However, there is limited data regarding the amount of existing WTPs in the TSA. District staff are concerned that the assumptions for WTPs have not been adequately reflected in the base case forecast.

A sensitivity analysis tested retention targets based on Table 20a and a 50-percent retention within the timber harvesting land base, as recommended in the *Provincial Wildlife Tree Management Recommendations*. This resulted in excluding 4365 hectares from the timber harvesting land base, which reduced the forecast by 2 percent relative to the base case in the short to long term. An alternative forecast showed it was possible to achieve the same short term harvest level as the base case, if the forecast declined by 6 percent in the mid term and to a level below the base case level in the long-term.

Based upon my review of the information and my discussions with BCFS staff, I accept that the base case forecast did not adequately reflect the retention of WTPs within the timber harvesting land base. I am mindful there may be an opportunity to overlap some of the areas for prime pine mushroom habitat (see *botanical forest products*) with WTPs. As shown in the sensitivity forecast, there is up to a 2-percent downward pressure on timber supply in the short to long term. For this determination, I have accounted for underestimating WTPs, as discussed in 'Reasons for decision'.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that this—together with other provisions in the Forest Practices Code, such as riparian management, maintenance of wildlife trees, and other forest cover objectives as discussed throughout this document—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, attributes of old-growth forests.

The delineation and formal designation of 'landscape units' is a key component of a sub-regional biodiversity management strategy. For the Nass TSA, draft landscape unit boundaries and biodiversity emphasis options (BEOs) were delineated by the district manager and designated environmental official in 1999. As noted above in stand-level biodiversity, it is expected that the timber supply analysis recognize the Forest Practices Code which sets out requirements for stand- and landscape-level biodiversity. Hence, the draft boundaries and BEO assignments were used in the timber supply analysis.

I have reviewed the assumptions used to account for landscape level biodiversity in the analysis for the Nass TSA, and I am satisfied that the majority of the assumptions appropriately reflect the provincial policy direction for achieving landscape level biodiversity requirements provided in the *Landscape Unit Planning Guide*. My consideration of those assumptions for which I believe some further discussion is required is detailed below.

- ageing of non-contributing forests

In the timber supply analysis for the Nass TSA, forests outside the timber harvesting land base (non-contributing forests) were assumed to age indefinitely, such that eventually all of the old-seral requirements for landscape-level biodiversity were met from the non-contributing forest. No allowance was made for the possible influences that natural stand disturbances such as fire, insects or disease may have on the age class structure over time.

In the Nass TSA, natural disturbance patterns are such that infrequent, but large wildfires affect the age class structure of the forests on the non-contributing land base. District and Timber Supply Branch staff agree that continual ageing of the non-contributing forest is unlikely.

Two sensitivity analyses examined the impact of incorporating a rate of disturbance in the non-contributing forest such that in the long term the amount of old-seral forest reflects the mean natural disturbance level. One showed that it was possible to maintain the harvest level in the short term; however in the mid term the forecast declined by about 27 percent, well below the steady long-term harvest level of 407 000 cubic metres per year; after 15 decades the harvest level increased to a level 7.4 percent below the steady long-term harvest level. Alternatively, the second forecast showed that to avoid the large decline in the mid-term level, an immediate decrease of 16 percent was required, with a 7.4-percent decrease in the long term.

Given the significant impact of this factor alone, I requested an additional examination of alternative harvest flows. A subsequent forecast that balanced timber supply impacts between the short and mid term, showed that it was possible to reduce the short term impact to a maximum of 12 percent, however the long term impact remained at 7.4 percent.

Clearly, since non-contributing forests do experience some amount of stand-level disturbances, the contribution of these forests to entirely meeting old-seral requirements has been overestimated in the analysis. The sensitivity analyses—that show the timber supply implications of assuming a more realistic ageing pattern for the non-contributing forest—indicate that the base case forecast has been overestimated by up to 12 percent in the short term, and 7.4 percent in the long term. For this determination, I have accounted for this overestimation, as discussed below in 'Reasons for decision'. The introduced risk will be limited by the fact that the next AAC determination will include an ageing pattern for the non-contributing forests.

- Kwinageese Watershed Integrated Resource Management Plan

In 1992, Orenda Logging Ltd. prepared the *Kwinageese Integrated Resource Management Plan* (IRMP) for the district manager's approval. The plan addresses the management of biological values in the Kwinageese watershed. The Kwinageese IRMP includes recommendations for the management of biological values, which are based upon ecological classification. Participation and support for this plan was received from the Department of Fisheries and Oceans, Ministry of Forests, former Ministry of Environment, Nisga'a Tribal Council, stakeholders, and the general public. The district manager approved the plan in July 1993 in order to provide guidance on forest management in the planning area.

The approval and implementation of the Forest Practices Code in 1995 superseded most of the recommendations in the Kwinageese IRMP with the exception of those for riparian management, which exceed the Forest Practices Code guidelines.

In the timber supply analysis for the Nass TSA, an additional 372 hectares were excluded from the timber harvesting land base for the management of riparian retention as recommended by the Kwinageese IRMP. District staff agree with the exclusion and confirm that riparian retention in forest development plans reflects the guidance of the Kwinageese IRMP and represents current forest management practice on the Nass TSA.

Based upon my review of the information and discussions with district staff, I accept that the assumptions regarding the additional requirements for riparian management, as recommended in the Kwinageese IRMP are consistent with current forest management. Therefore, I am satisfied with the assumptions in the base case forecast. I encourage staff from the appropriate agencies to work together to ensure that the Kwinageese IRMP is incorporated into future landscape-unit planning.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

First Nations

With respect to First Nations issues in the Nass TSA, I am aware of the following:

- I have determined that four First Nations have, or may have, aboriginal interests in the TSA. These First Nations are the Iskut Indian Band, the Gitxsan, the Gitanyow and the Nisga'a Nation. The first three of these First Nations assert traditional territories within the Nass TSA. The rights and interests of the Nisga'a Nation are set out in the Nisga'a Final Agreement (NFA) signed by the Nisga'a Nation, Canada and British Columbia.

- These four First Nations were all forwarded copies of the Nass Timber Supply Area Data Package, Information Report, Timber Supply Analysis and Public Discussion Paper, and were asked to review the documents and provide written comments. The First Nations were also invited to contact the Kalum Forest District if they desired a presentation on the information. There were no responses or requests for meetings or

presentations. Therefore, I have not directly been presented with strong claims specifically respecting this AAC determination.

- I previously reduced the AAC of the Nass TSA to account for removal from the Nass TSA of Nisga'a Lands identified under the NFA. Since Nisga'a Lands are no longer part of the TSA, they are not the subject of this determination.

- I am aware that in 1977, prior to initiation of the British Columbia Treaty Commission (BCTC) Treaty Process, the Gitanyow submitted a Comprehensive Claim to the federal government. Canada accepted that claim for negotiation in that same year, however, there is no record of any negotiations between the Gitanyow and Canada prior to the BC Treaty Process. The Gitanyow have signed a Framework Agreement with Canada and British Columbia under the BCTC Treaty Process. I am also aware that efforts were made to initiate mediated negotiations among the Gitanyow, Nisga'a, Canada and British Columbia with respect to Gitanyow concerns about the Nisga'a Final Agreement. At this time, continuation of this process requires agreement by the two First Nations to re-engage.

- Under the current BCTC Treaty Process, the Gitxsan have signed a Framework Agreement with Canada and British Columbia. I am also aware that the Gitxsan-Carrier Tribal Council submitted a Comprehensive Claim to the federal government in 1977 on behalf of member bands, which included the Gitxsan.

- I have familiarized myself with the Supreme Court of Canada findings in *Delgamuukw* respecting the scope of title of the Gitxsan. While much remains to be resolved, at this time I note that the tests for proof of Aboriginal title developed by the courts (exclusive, continuous occupation) suggest that Gitxsan title would apply to only a portion of the entire claim area, which covers a significant portion of the Nass TSA.

- I am aware that the Gitanyow and Gitxsan claim that their territories overlap with land placed under Nisga'a management in the Nisga'a Agreement in Principle (Sterritt et al, 1998, p. 251), and subsequently in the NFA.[1]

- The Nass Wildlife Area, which is referenced under the NFA, overlaps with the Nass TSA. The NFA describes decision making processes and wildlife management rules for the Nass Wildlife Area. Kalum District staff have informed me that wildlife management provisions within the Nass Wildlife Area have not affected timber harvesting to date.

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[1] Reference: Sterritt , N.J, S. Marsden, R. Galois, P.R. Grant, and R. Overstall. 1998. *Tribal Boundaries in the Nass Watershed.* Vancouver B.C.: UBC Press.

- The NFA provides for a Wildlife Committee and a Joint Fisheries Management Committee. At the time of this AAC determination, neither committee has made recommendations to the responsible Minister respecting fishery or wildlife management, and the responsible Minister has made no decisions that would change management from that modeled in the Nass TSA base case.
- At this time, the Iskut Indian Band is not engaged in the BCTC Treaty Process.
- There are no First Nation communities in the TSA.
- First Nations people hunt, fish and trap within the TSA.

Based on the above information I have concluded the following:

- I am satisfied that the provisions of the NFA have been considered and, to the extent they are relevant to my AAC determination, complied with in connection with this AAC determination.
- With respect to assertions by the Gitanyow and Gitxsan of aboriginal interests within the Nass TSA, and of claims that their traditional territories overlap with land now under Nisga'a management, I note that these claims introduce uncertainty to my determination. However, I observe that the nature, scope, and geographical location of potential rights and title remain inconclusive. As such I am not convinced at this time that the interests would logically extend to an impact on the AAC. Based on these conclusions, I will make no related adjustments for this determination.
- The potential rights and title of the Iskut Indian Band introduce uncertainty into my determination. However, the nature, scope, and geographical location of potential rights and title remain inconclusive. I am not convinced at this time that the interests would logically extend to an impact on the AAC. Based on these conclusions, I will make no related adjustments for this determination.
- I acknowledge the provisions of the NFA relating to the Nass Wildlife Area and the Nass Area, and associated consultation requirements. However, my AAC determination does not prescribe any particular plan or location of harvesting activity within the Nass TSA and I am satisfied that no consultation with the Nisga'a Nation under the provisions of the NFA is required at this time.
- In general, hunting, fishing, trapping and other traditional uses within and outside of the Nass Wildlife Area can be accommodated without timber supply impacts additional to those projected in the base case through provisions of the Forest Practices Code, such as protection of riparian areas and management for biodiversity, and during operational planning. Finally, no decisions have been made by the responsible Minister regarding either wildlife or fishery management that require changes to management from that modeled in the timber supply analysis. Given all of the above, I will make no timber supply adjustments on account of these considerations.

I will consider any new information, including any decisions on treaty negotiations with the First Nations that are undertaken by government, at the time of my next AAC determination. If new information contradicting any of my conclusions becomes available during the effective term of this determination, I may re-visit this determination prior to the required time.

In the meantime, as I have noted in my 'Guiding Principles,' the AAC that I determine should not in any way be construed as limiting the Crown's obligations resulting from recent court decisions including those of the Supreme Court of Canada or from the NFA. In this respect, the AAC that I determine does not prescribe any particular plan of harvesting activity within the Nass TSA by requiring any particular area to be harvested or to remain unharvested. My AAC determination is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

As I make my AAC determination, I am mindful of the responsibility of other statutory decision makers to administer the determined AAC consistently with other legislation, with relevant court decisions respecting the interests of First Nations, and with the Nisga'a Final Agreement.

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old growth to harvesting second growth is a major consideration in determining AACs in many parts of the province. In the short term, the presence of large volumes of older forests often permit harvesting above long-term levels without jeopardizing the sustainability of future timber supply. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and mid-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain sufficiently stable so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts that are not required to maintain forest productivity and future harvest stability.

In the analysis for the Nass TSA, two alternative rates of harvest were evaluated in addition to the base case forecast. One alternative forecast, in which the highest initial harvest level was tested, illustrated that an initial level of 900 000 cubic metres per year could be attained. However, this resulted in a decrease in the mid-term to 320 000 cubic metres per year, which is 21 percent lower than the long-term harvest level projected in the base case. Although this represents a dip in the mid-term, this level does not drop below a projected steady harvest level based on existing stand yield estimates, i.e. without the timber supply benefit expected from improved growth and yield associated with future managed stands. In the long term, the same harvest level was achieved as projected in the base case.

In the second alternative forecast, an initial harvest level was projected at a level that approximated the current average harvest of about 553 000 cubic metres per year (see *community dependence*). This level could be maintained for 7 decades prior to decreasing to the same mid- to long-term harvest level as projected in the base case.

In making my determination, I have taken into account the feasibility of a higher starting level than that projected in the base case forecast, together with careful assessments of the range of uncertainties related to specific considerations laid out in this document, as noted in 'Reasons for decision'.

- community dependence

The socio-economic analysis for the Nass TSA details the impact of timber supply adjustments on local communities and the provincial economy.

The Nass TSA is remote and sparsely populated with a permanent population of approximately 2,000 people (1996 census). The communities within and adjacent to the area include Stewart, Meziadin, Elsworth Camp, Van Dyke Camp, Nass Camp, Gitlakdamix, Gitwinksihlkw, Gitanyow, Gitwangak, Kitwanga and Lakalzap.

The most significant contributors to the economy of the Nass TSA are the public sector, the forestry sector, and other primary industries such as mining, and tourism. The forestry sector accounts for 25 percent of the total employment in the Nass TSA.

Other important sources of income in the area include the commercial harvesting of pine mushrooms, which are generally only harvested in the fall. For example, in 1994 about 160 000 kilograms of pine mushrooms worth an estimated 4.2 million dollars were harvested in the area. Employment opportunities also arise from the area's Meziadin fishway, one of the Northwest's major sockeye producers, and a number of gold and copper properties and mineral processing in and around Stewart.

Actual annual harvest levels in the Nass TSA have been less than the AAC for the past few years. The average volume of timber harvested between 1997 and 2000 was approximately 553 000 cubic metres, which is 48 percent of the current AAC of 1 142 400 cubic metres. This level of harvesting supports an estimated 1010 person-years of total annual employment province-wide, of which 97 person-years of employment are within the Nass TSA, and provides the provincial government with an average annual revenue of 11.2 million dollars. If fully utilized, the base case harvest level of 820 000 cubic metres per year has the potential to provide the provincial government with approximately 16.5 million dollars of annual revenue.

Public input received from a licensee expressed concern that communities dependent on the forest industry are experiencing difficulties regarding their economic survival at this time.

I note that the inability to fully harvest the AAC is largely due to the current economic circumstances. I also acknowledge the linkage between actual harvest levels and access difficulties to the Upper Nass area, which in turn can affect the economic stability of local communities.

I have reviewed the socio-economic analysis that used an established and sound methodology to evaluate the community dependencies for the Nass TSA. I am mindful that the current harvest levels have on average been about 48 percent lower than the current AAC; nonetheless the communities within the Nass TSA are dependent on the timber supply from the TSA.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

Timber processing facilities

Although the Nass TSA does not have any timber processing facilities, I am aware of the reliance of adjacent timber processing facilities on the volume of timber harvested in the Nass TSA.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

The Minister's letter and memorandum

The Minister has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester—a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996, (attached as Appendix 4). The letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability." He placed particular emphasis on the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for the Nass TSA. I have reviewed the information about the applicability of commercial thinning in the TSA, and I conclude that there are limited opportunities for commercial thinning at this time. As the second growth stands in the TSA age, opportunities will likely increase and if so I will consider this further at a future determination.

With respect to harvesting in previously uneconomic areas, I have considered the assumptions applied in the analysis, and as discussed below in 'Reasons for decision', I have considered establishing a partition for the Nass TSA.

The Minister's memorandum addressed the effects of visual resource management on timber supply. In it, the Minister asked that pre-Code constraints applied to timber supply in order to meet VQOs be re-examined when determining AACs in order to ensure they do not unreasonably restrict timber supply. For the Nass TSA, this matter was considered through the accounting of current management as discussed under *visually sensitive areas.*

Local objectives

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the timber supply review where these are consistent with government's broader objectives. Many public responses were received to the information report and data package, and to the timber supply and socio-economic analyses, some of the comments were not outside of my responsibility under Section 8 of the *Forest Act.* The summary of public input is reproduced in full as Appendix 5.

Local objectives have been an important consideration in my AAC determination for the Nass TSA. I have considered all public input received on the timber supply review that is consistent with Section 8 of the *Forest Act*, and where appropriate I have responded briefly to this input in this rationale.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Unsalvaged losses

As discussed earlier in the Upper Nass factor, I have observed high mortality in the balsam stands in the Upper Nass. I have accounted for this infestation as discussed below in 'Reasons for decision'. Apart this concern, I have reviewed the information regarding unsalvaged losses for stands in the Nass TSA and I am satisfied that these losses were appropriately accounted for in the base case forecast.

Reasons for Decision

In reaching my AAC determination for the Nass TSA, I have considered all of the factors presented to me, and I have reasoned as follows.

The timber supply analysis for the Nass TSA indicated that an initial harvest level of 820 000 cubic metres per year could be maintained for one decade, prior to decreasing by 10 percent in each of the subsequent six decades to the long-term harvest level of 407 000 cubic metres per year. I note that the base case forecast excludes the timber supply contribution of the Upper Nass area.

In determining this AAC, I have identified a number of factors that indicate that the timber supply may be over- or underestimated compared to the base case forecast. Some can be quantified while others may influence timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at the time of this determination. I have discussed these factors in terms of the Lower and Upper Nass in more detail below.

Lower Nass -base case forecast

One factor has been identified that indicates that the timber supply in the base case forecast has been underestimated by a quantifiable amount, as follows:

- *TSA boundary change* - the addition of area associated with the boundary adjustment resulted in an underestimation of 1667 hectares of timber harvesting land base in the Nass TSA. This represents less than a 1-percent underestimation in timber supply across the entire forecast period.

Another factor indicates that the timber supply in the base case has probably been underestimated, but to a degree that cannot be well quantified, as follows:

- *site productivity* – site productivity of second-growth forests is likely underestimated by site index measurements taken from existing old growth forests. If provincial trends are found to apply to the Nass TSA, the underestimation could indicate that timber supply is up to 57 percent higher than shown in the base case forecast in the mid to long term. If the trends from the studies in the Kalum TSA are applicable to the Nass TSA, timber supply could be underestimated by up to 92 percent in the mid to long term. However, I remain mindful of possible limitations on full achievement of the potential indicated by these studies, due to the influence of biotic factors on regeneration success as discussed earlier in this document.

On the other hand, there are a number of factors that indicate the base case forecast likely overestimates timber supply. Those factors that can be quantified are as follows:

- *Nisga'a Lands* – the deduction of 85 hectares of Nisga'a fee simple lands represents a very small overestimation in the size of the timber harvesting land base.
- *not-satisfactorily-restocked areas* – about 3192 hectares of backlog NSR area will likely not be restocked to managed stand stocking standards. This represents an up to 1-percent overestimation in the mid- to long-term timber supply.

- *identified wildlife management strategy* – I accept that the implementation of the IWMS, including identification of wildlife habitat areas and implementation of general wildlife measures, will result in an impact to the timber harvesting land base of up to 1 percent throughout the forecast period.
- *wildlife tree patches* – I accept that the extent to which retention targets for WTPs will be met by stands in the non-contributing forest has been overestimated. It is probable that at least half of the WTPs will be located on the timber harvesting land base, which indicates an up to 2-percent overestimation in the short-to long-term timber supply.
- *ageing of non-contributing forest* – forests outside of the timber harvesting land base are not likely to age indefinitely as reflected in the base case forecast. I accept that the impact of allowing for natural disturbance levels in the non-contributing forests results in a timber supply impact of 12 percent in the short term and up to 7.4 percent in the long term.

Factors that indicate that the base case may overestimate actual timber supply, but to a degree that cannot be quantified, are as follows:

- *problem forest types* – it is unlikely that all the leading-hemlock and -balsam stands greater than 141 years of age are merchantable and therefore some portion should be excluded as problem forest types. This represents an unquantified overestimation of the timber supply in the short and long term.
- *volume estimates for existing stands* – there is some uncertainty about the volume estimates for existing stands. I have considered this to represent an unquantified risk that the existing stand volumes may be overestimated in the short and mid term.
- *riparian habitat* – the management requirements for riparian habitat along S4, S5, and S6 streams was not accounted for in the base case forecast. This represents an unquantified overestimation of the timber supply in the short to long term.
- *botanical forest products* – while there may be some overlap with areas to be retained for wildlife trees patches, there is likely some additional constraint on timber supply. I consider this to represent an unquantified downward pressure on the timber supply throughout the forecast period.

From reviewing all of my considerations documented above, including the above list of factors identifying under- and overestimations in the projected timber supply, I have reasoned and concluded as follows.

I have considered that the cumulative impact of those factors that can be quantified (Nisga'a Lands, identified wildlife management strategy, wildlife tree patches, and ageing of the non-contributing forest) and that act to decrease short-term timber supply, indicate that the timber supply has been overestimated by up to 15 percent in the short term. The impact of the one factor (TSA boundary change) acting to increase short-term timber supply is about 1 percent. Overall at this point, the net result is about a 14-percent overestimation of timber supply in the base case forecast. Taking these factors into account would suggest that the appropriate harvest level for the Lower Nass area should be about 700 000 cubic metres per year in the short term. However, this does not take into account

four additional factors that are unquantified, but nonetheless suggest short-term timber supply has been overestimated in the base case.

I am concerned about the contribution of the older (greater than 140 years) hemlock and balsam stands to the base case forecast. It is unlikely that even with a mandatory pulp utilization requirement, not all of the older hemlock and balsam stands will be merchantable and hence harvested. Therefore, I consider the inclusion of all of these stands in the timber harvesting land base to represent a further downward pressure. As well, I am concerned about the volume estimates for existing stands. I acknowledge that the inventory audits did not indicate a statistical difference between ground samples and the forest inventory. Nonetheless, BCFS district staff have continued to express their concern, which is based on the information contained in cruise reports and anecdotal information from local contractors, that the mature stand volumes are overestimated. Based on my review of this information, I acknowledge that there is still some uncertainty about the projections for existing stand yields. Given the potential order of magnitude of these two factors and my experience working in the Prince Rupert Region, I am prepared to take this uncertainty into account in this determination.

The other two unquantified factors—botanical forest products (pine mushrooms) and riparian habitat—for which the risks posed to timber supply cannot be precisely measured, must also be considered in this determination. I do not believe that constraints for managing for pine mushroom habitat will entirely overlap with WTPs. Whether it is longer rotations or avoidance of harvesting in certain areas, managing for this resource introduces some degree of impact that is not accounted for in the analysis. Riparian habitat along S4 to S6 streams has also not been measured, but again I must recognize the potential risk to timber supply in the short and long term.

I am faced with deciding how to account for the combined impact of these four factors in this determination. Although there is no exact measure of their cumulative effect available, in my judgement these factors present a very real risk that timber supply could be overestimated if I do not explicitly account for them in some manner in this determination. Again, in my judgement, based on local knowledge as well as experience gained from reviewing similar issues elsewhere in the province, I feel obliged to assign a possible order of magnitude to the combined influence that these factors could exert on the timber supply projections for the Nass TSA.

I note that determining the risk that these four factors pose to timber supply, in the absence of further specific analysis, is an issue of pure judgement. I have reasoned as follows. My single largest concern is with respect to the assumptions of full merchantability of the oldest of the balsam and hemlock stands (i.e., those older than 250 years of age). I note that a significant portion (46 percent) of the timber harvesting land base is represented by these types of forests. With respect to the uncertainty around the timber supply implications of management for botanical forest products and riparian habitat, I expect based on my experience that these two factors exert only a small downward pressure on timber supply. I am satisfied that these two factors do not represent the magnitude of concern that I have stated for the full inclusion of the older age forests. And finally, I must consider how to assess the risk of the inventory overestimation of existing stand yields in the context of

these previous three factors. The uncertainty around the inventory remains a risk and is part of the compelling reason for me to place weight on the combined factors in this decision.

In the lack of any specific data or quantitative analysis around the impacts, I need to make a judgement as to the degree to which these factors will affect timber supply. I further note that I have reviewed timber supply assumptions across the province and I have seen some quantification of similar issues in other units. Using this background, and placing most of the weight on the merchantability concerns, I consider it likely that the combined effect of these factors will not exceed a further 10 percent downward influence on timber supply in the short term. Such an impact would represent a further reduction in the short-term harvest level from 700 000 cubic metres per year to 630 000 cubic metres per year.

This assumption of a further 10 percent short-term timber supply impact is based on the premise that no overlap exists between the described factors. In my judgement, there is a high likelihood that there is a fair degree of overlap between the suspected overestimation of existing stand yields, and the uncertainty around the full merchantability of very old hemlock and balsam stands. In consideration of this, and because I believe that this judgement-based approach still carries some uncertainty, I prefer to examine an impact that reduces the harvest level to an order of magnitude ranging from 700 000 cubic metres to 630 000 cubic metres per year. In the absence of any further quantifiable information to guide me in placing more weight on either end of the range, I am selecting the mid point of this range, with the view that it represents a reasonable accounting for the combined effect of these additional four factors. I am therefore confident that a harvest level of 665 000 cubic metres per year is a reasonable level that balances the risks to timber supply in the short term.

In the mid to long term, the quantified impact to timber supply from overestimating the contribution of 3192 hectares of backlog NSR area represents up to a 1-percent overestimation. I am satisfied that this impact will be offset by the increased timber supply resulting from the underestimation of site productivity in second growth forests. The likelihood that site productivity has been underestimated is high as evidenced by a growing body of provincial research. However, at this time it is difficult to state with certainty the degree to which site productivity has been underestimated, due to the lack of comprehensive localized studies for the Nass TSA. Nonetheless, I expect that the mid- to long- term timber supply is higher than indicated in the base case forecast. In any event, when further information becomes available it can be factored into subsequent determinations.

Upper Nass

To understand the timber supply projections for the Upper Nass, I examined a critical issues analysis that included the timber supply contribution from the Upper Nass area. Where appropriate, as with the Lower Nass area, I considered the influence of the factors identified in this document on this timber supply contribution. The critical issues analysis showed that for the total TSA, the initial harvest level could be 1.059 million cubic metres per year, and indicated that the Upper Nass could contribute about 239 000 cubic metres per year to this level in the short term, and up to 118 000 cubic metres per year in the long term. However, as with my consideration of the base case forecast for the Lower Nass, the

assumptions applied in the critical issues analysis did not entirely capture the current understanding of forest management for factors such as identified wildlife management strategy, wildlife tree patches, and ageing of non-contributing forest. I believe that these three factors account for about a 14 percent overestimation of timber supply in the Upper Nass area as well, and bring the harvest level forecast for the area to about 205 000 cubic metres per year in the short term.

In my considerations for the Upper Nass, I have further considered the uncertainty around the timber supply impacts of the remaining unquantified factors discussed earlier (problem forest types, volume estimates for existing stands, riparian management areas, and botanical forest products). I am satisfied that these factors, with the exception of the accounting for riparian management practices, are likely to have less direct influence on timber supply in the Upper Nass due to the different nature of the forest conditions there, and as a result I will not take them into account in this determination. However, with an accounting for riparian management practices, I believe a short term contribution from the area to more appropriately be 200 000 cubic metres per year.

This assessment of timber supply does not take into account the concern about the balsam bark beetle infestation and its potential impact on short-term timber supply. It is very difficult to precisely estimate volume losses due to the balsam bark beetle infestation; some amount of the attacked timber can likely be salvaged and the impact is not entirely cumulative to the quantified factors discussed in the above paragraphs. From my observations on my overview flight, I have observed that the volume losses due to the balsam bark beetle could be as much as 20 percent, which analysis showed on its own merits corresponded to a 30 percent reduction in short-term timber supply from the area if none of the volume was salvageable, which I consider unlikely. If this impact were assumed to be additive, this could reduce the Upper Nass's contribution to the total harvest level to about 140 000 cubic metres per year. If one third of the total balsam was assumed to be salvageable, which I conservatively believe is a reasonable recognition of this issue, this would result in a reduction in short-term timber supply to a level that is about 160 000 cubic metres per year. I acknowledge the overall uncertainty with the loss estimate, the difficulty in determining the merchantability of the damaged timber in the absence of operational experience in the area, and the likelihood that the impact is not additive, and I consider the 160 000 cubic metres per year level to represent the lower bounds of a possible range of uncertainty associated with the Upper Nass harvest level. The upper bounds of the range is the original 200 000 cubic metres per year revised estimate for this area before reference to the balsam bark beetle implications. Therefore, I consider that a suitable range for the harvest contribution from the Upper Nass to be between 160 000 and 200 000 cubic metres per year in the short term. In the long term, due to underestimations in site productivity for second growth forests, I believe that the harvest forecast could be much higher than the current long-term projection of 118 000 cubic metres per year.

While the timber supply analysis excluded the Upper Nass, at this time I am not prepared to eliminate the possibility that harvesting could occur in this area. I am aware of the uncertainty regarding the economic viability of operating in the Upper Nass, but I note that excluding this area forfeits opportunities that could offset further reductions to the harvest levels in the Nass TSA. I acknowledge the profound difficulty of forecasting with certainty

the future development in the Upper Nass, but rather than deny the opportunity to demonstrate that this area can be developed, I believe it is reasonable to continue to include a timber supply contribution from the Upper Nass area.

I am also mindful of the public input received regarding the suggestion of a partition of the AAC attributable to the Upper Nass. As noted in my discussions under the Upper Nass section earlier in this document, I have considered the information presented to me, and I am satisfied that it is appropriate to establish a partition to the Upper Nass area.

In determining at what level to set the partition, I am placing weight on three considerations. First, I recognize that there are high fixed costs associated with developing this remote area and it is therefore desireable to set a higher rather than a lower harvest level to ensure the maximum possible opportunity exists to economically develop the area. Secondly, having some familiarity with the forest health issues in this area, and recognizing the declining vigour in many of the stands due to their older ages and the ongoing influence of the balsam bark beetle, I am compelled to again consider a higher rather than a lower harvest level. Thirdly, I hold the possibility of higher second growth productivity in this area given the findings of provincial site productivity studies.

Therefore, considering the information, and having reviewed the harvest flow projection for the Upper Nass, I am placing weight on the upper end of the range between 160 000 and 200 000 cubic metres per year as representing a reasonable harvest level for this area. At 200 000 cubic metres per year, the partition provides the maximum opportunity for the area to be economically developed and at the same time have the forest health concerns addressed. I am setting a partition of 200 000 cubic metres per year attributable to the Upper Nass area (as shown on the map contained earlier in this document). I will leave the administration of the partition up to the judgement of the relevant regional and district managers.

In summary, I believe that a harvest level of 865 000 cubic metres per year is an appropriate harvest level for the Nass TSA at this time. To ensure that the full AAC is not solely harvested from the Lower Nass, I have specified a partition of 200 000 cubic metres per year for the Upper Nass. Therefore the contribution from Lower Nass will be a maximum of 665 000 cubic metres per year, which I note reduces the AAC to a level that is close to the recent actual harvest level of 550 000 cubic metres per year, yet still provides an opportunity to increase the actual level of overall harvest if market conditions or other circumstances improve. This level and the partition will ensure that there is little risk to good forest stewardship from overharvesting in the Lower Nass, should the Upper Nass remain inaccessible. This determination continues to allow a provision for demonstrating an opportunity to develop the Upper Nass within the next five years. At the time of the next AAC determination, I will review the timber supply projections from the Upper Nass to once again assess its future contribution.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved in the Nass TSA by establishing an AAC of 865 000 cubic metres, which includes a 200 000 cubic metre partition to the Upper Nass.

This determination is effective August 1, 2002, and will remain in effect until a new AAC is determined, which must take place within five years of the date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

Partition definition

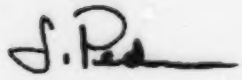
This partition is with respect to the Upper Nass, which encompasses the Sallysout watershed and the area east of the Taylor, Taft and Bell-Irving watersheds (as shown on the map earlier in this document).

Implementation

In the period following this decision and leading to the subsequent determination, I encourage staff from the Ministries of Forests; Water, Land and Air Protection; and Sustainable Resource Management to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Nass TSA. I recommend that staff undertake the following:

- continue to monitor harvesting activities to ensure that harvesting using cable systems continues to be proportionate to the assumed contribution of these areas to the timber harvesting land base;
- examine criteria for defining problem forest types to gain a better understanding of merchantability in hemlock and balsam stands greater than 141 years of age;
- collect data from the Nass TSA to confirm appropriate estimates of site productivity;
- refine the regeneration delay estimate to reflect the current practice;
- continue to monitor silviculture treatments, assess the stocking levels of plantations that could potentially fail and continue to study the extent to which the use of alternative silvicultural systems will reduce the regeneration difficulties currently being encountered in some stands;
- assess the stocking of NSR sites and their ability to be reforested, particularly in old burns and areas with no harvesting history;

- monitor the extent to which good visual design influences the acceptable level of disturbance in visually sensitive areas;
- continue to monitor and refine the methodology to account for retention along S4 to S6 streams;
- work with appropriate agencies to identify and establish WHAs; and
- work together to ensure that the recommendations of the Kwinageese IRMP are incorporated into landscape-unit planning.



Larry Pedersen
Chief Forester

June 12, 2002

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the Forest Act, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silvicultural treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

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Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

   (a) encourage maximum productivity of the forest and range resources in British Columbia;

   (b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

   (c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

   (d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

   (e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

Appendix 5: Summary of Public Input

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
Ministry of Forests
OFFICE OF THE MINISTER

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: **The Crown's Economic And Social Objectives Regarding Visual Resources**

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis.*

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests

Nass Timber Supply Area
Timber Supply Review

Summary of Public Input

BC Ministry of Forests
Kalum Forest District
Rm. 200 – 5220 Keith Ave.
Terrace, BC
V8G 1L1

June, 2002

This is a summary of the public input received on the Timber Supply Review in the Nass Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

Nass Timber Supply Area

Background

As part of the review of timber supply in the Nass Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Nass Timber Supply Area *Data Package* and *Information Report* in May 2000. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Nass TSA. A 30-day review period, ending June 5, 2000, was provided for the public to comment on these documents.

On June 14, 2001, the British Columbia Forest Service released the *2001 Nass Timber Supply Area Analysis Report* and *Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 45-day review period that ended July 30, 2001.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the AAC for the Nass TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Kalum Forest District office.

Public Review Process and Response

Kalum District staff actively solicited public input on the Timber Supply Review in the Nass TSA through the following actions:

- copies of the *Data Package, Information Report, Analysis Report* and *Public Discussion Paper* were mailed to 16 stakeholders, including First Nations, licensees, local governments and local interest groups. Meetings or presentations were offered.
- the *Data Package* and *Analysis Report* were available at the Kalum district office in Terrace, the Kalum field office in Stewart, and the Prince Rupert regional office in Smithers.
- newspaper advertisements were placed, advising of the availability of all documents for review by the public.
- copies of all the documents were made available to the local media. Interviews were conducted with the local newspaper.
- presentations to the Kalum TSA Steering Committee (eight participants) and the District of Stewart (five participants) were made on May 8, 2000.
- a presentation to the Regional District of Kitimat/Stikine (three participants) was made on June 24, 2000.
- referrals were made to the Ministry of Forests website where documents were available to download.

The Kalum Forest District received two written submissions on the *Data Package* and four submissions on the *Analysis Report* (see Appendix 1).

Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the Nass TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report
- Other comments

Data Package

Land Base Factors

The submission from Skeena Cellulose Inc. says that reducing the timber harvesting land

base (THLB) limits the opportunity to address the severe decadence problem in the TSA when markets are favourable. The company also requests a review of cable operability, expressing the opinion that this will reveal that conventional harvesting has extended significantly into areas designated for cable harvesting. Skeena Cellulose also asks to know the basis for the estimation that 20 percent of cable terrain is being isolated by the use of backhoes.

The submission from the Mayor of the District of Stewart says the extended lull in the pulp market has clouded the issue of marginal wood, noting that pulp prices are currently high and expected to remain that way for two to three years. The mayor's submission says reducing the size of forest licences reduces the ability of licensees to be flexible. As volume decreases, so does potential for profit and without profit there is no hope of funding access to marginal wood, according to this submission. The mayor says a blending of marginal wood and close wood is a formula for stability and that removing marginal wood from the operable land base means fewer, more intermittent jobs based on pulp price alone.

Upper Nass Zone
Skeena Cellulose says the lack of activity in the Upper Nass is due to poor markets, expensive access and haul costs, and the fact no operating areas have been allocated. The company says if the government doesn't accept industry recommendations, the Upper Nass may not be accessed over the next five years, unless the market improves significantly.

In this submission, Skeena Cellulose says the Upper Nass zone could be removed from the timber harvesting land base temporarily, but expresses two concerns:

- this would limit the opportunity to catch up on past undercuts and replace decadent and pest-damaged stands with thrifty, vigorous forests if favourable markets return, and,
- it could be difficult to return the area to the THLB, given the political climate in relation to environmental interest groups.

Instead of a land base reduction, the company suggests reducing the AAC by taking a liberal projection of the impacts to merchantable timber volumes from prevalent pest agents, or partition the cut between the Upper Nass and the rest of the TSA. The company notes that allocation of operating areas would remain a significant issue in the second option.

Cut Control Requirements
Skeena Cellulose says there should be a relaxation of cut control requirements given the dependence of the harvest on favourable market conditions. A flexible cut control strategy is needed that would allow the full utilization of favourable market conditions to remove stands that are in a steady declining state of annual growth, according to the company.

Cable Harvest Partition
Skeena Cellulose says if the AAC is partitioned between cable and conventional harvest systems, it must be done by individual licence areas taking into consideration factors such as terrain and timber quality as well as economic factors such as distance from markets. The company says it doesn't believe this type of analysis has been conducted.

Timber Supply Area Analysis Report

Upper Nass Zone
West Fraser Mills expresses the opinion that it's not advisable or practical to change the size of the operable land base and harvest levels on the basis of short-term economics. The company recommends partitioning the AAC into an Upper and Lower Nass AAC, with no minimum cut control limits on the Upper Nass portion. This would meet Ministry of Forests' concern about overcutting in the Lower Nass and satisfy industry concerns about reduction of tenure rights, according to West Fraser.

Nass Timber Supply Area

The submission from the Regional District of Kitimat-Stikine says the decision to remove the Upper Nass zone is reasonable, provided this decision is reviewed with each subsequent timber supply review. The regional district says harvesting could become viable given provincial government policies permitting log exports, or government assistance with road construction or other employment development programs.

Deciduous Forests
The submission from the regional district says that although deciduous species are in limited supply in this TSA, policies to utilize these alternative woods should be encouraged.

Socio-Economic Factors
Skeena Cellulose says that the cyclical nature of the pulp market creates a very unstable economic climate and is especially difficult for communities that depend on the forest industry for their economic survival. Since licensees depend significantly on the pulp market, it is important they be able to take advantage of harvest opportunities during peak pulp markets.

Other Comments

Several submissions comment on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

Management Practices
The regional district's submission notes that the *Rural Land Use Bylaw* in the Meziadin area may impact forestry programs there, and says that any land and resource management strategy must consider high recreation values and quality sites for mushroom harvesting.

Harvest Levels
Five submissions comment on the harvest level to be determined by the chief forester.

The submission from the Regional District of Kitimat-Stikine says it is apparent than an AAC reduction is supportable and that a harvest rate of 1.14 million cubic metres per year could not be continued over any long term. One submission from Skeena-Cellulose says that instead of reducing the land base, an option is to reduce the AAC by allowing for a liberal projection of losses to pests.

Four of the five submissions express concern about a reduction in the AAC as a result of the removal of the Upper Nass zone. The following reasons are provided:

- a determination that maximizes the timber to be harvested would allow the removal of stands that are steadily declining, replacing them with thrifty, vigorous trees.
- the reduction will decrease the viability of future developments. Due to poor quality wood, the only way to be sustainable is through large volumes, thereby reducing overall costs.
- it would be based on short-term economics (recent poor markets).
- it would be unfair to licensees who have purchased licences and made business decisions on the basis of certain levels of cutting rights, which might not be returned to them if/when it became economical to harvest in the Upper Nass.

The following alternatives are suggested:

- partition the cut between the Upper Nass and the rest of the TSA.
- partition the Upper Nass with no cut control requirements.
- create three partitions: operable land base, Upper Nass and cable area. Only the operable land base would have an AAC and cut control as per current regulations, while periodic volumes would be determined for the problem areas. This approach would help stabilize a core operating area, while enabling licensees to take advantage of additional harvest opportunities during peak pulp markets.

Appendix 1

Submissions received by the Kalum Forest District

Submissions received on the Data Package

Forest industry
Skeena Cellulose Inc., Terrace Woodlands Operations

Local government
District of Stewart, Mayor

Submissions received on the Timber Supply Analysis Report

Forest industry
West Fraser Mills Ltd., Chief Forester
Skeena Cellulose Inc., Forest Resources Manager

Local government
District of Stewart, Mayor
Regional District of Kitimat-Stikine, Manager, Development Services